

Serial No. 10/694,511
January 17, 2005
Reply to the Office Action dated October 19, 2004
Page 2 of 9

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (currently amended): A cavity-down ball grid array package comprising:
a flexible circuit tape including a flexible tape laminated to a conductor layer, the flexible circuit tape having an aperture therein;

a thermally conductive heat spreader directly fixed to a first surface of the flexible circuit tape, the heat spreader having a cavity aligned with the aperture of the flexible circuit tape;

a semiconductor die mounted to the heat spreader, in a die-down configuration in said cavity;

a thermally conductive die adapter fixed to said semiconductor die such that a portion of said die adapter protrudes from said cavity;

a plurality of wire bonds connecting said semiconductor die to bond sites on said second surface of said flexible circuit tape;

an encapsulating material encapsulating said semiconductor die and said wire bonds; and

a plurality of solder balls disposed on a second surface of the flexible circuit tape, in the form of a ball grid array,

wherein the die adapter is comprised of one of silicon and silicon coated with a solderable layer.

Claim 2 (original): The cavity-down ball grid array package according to claim 1, wherein said thermally conductive die adapter comprises a plurality of thermally

Serial No. 10/694,511

January 17, 2005

Reply to the Office Action dated October 19, 2004

Page 3 of 9

conductive die adapter portions stacked on said semiconductor die.

Claim 3 (original): The cavity-down ball grid array package according to claim 1, wherein said die adapter comprises a plurality of thermally conductive die adapter portions fixed side-by-side on said semiconductor die.

Claim 4 (original): The cavity-down ball grid array package according to claim 1, further comprising wire bonds connecting said semiconductor die to said die adapter.

Claim 5 (original): The cavity-down ball grid array package according to claim 1, further comprising wire bonds connecting said semiconductor die to said heat spreader.

Claim 6 (original): The cavity-down ball grid array package according to claim 1, further comprising wire bonds connecting said heat spreader to said die adapter.

Claim 7 (original): The cavity-down ball grid array package according to claim 1, further comprising wire bonds connecting said flexible circuit tape to said die adapter.

Claim 8 (original): The cavity-down ball grid array package according to claim 1, wherein said die adapter protrudes from said encapsulating material such that at least a surface of said die adapter is exposed.

Claim 9 (original): The cavity-down ball grid array package according to claim 2, wherein one portion of said die adapter is a solid ground.

Claim 10 (original): The cavity-down ball grid array package according to claim 2, wherein one portion of said die adapter is a solid power.

Serial No. 10/694,511
January 17, 2005
Reply to the Office Action dated October 19, 2004
Page 4 of 9

Claims 11-14 (canceled).

Claim 15 (new): A cavity-down ball grid array package comprising:
a flexible circuit tape including a flexible tape laminated to a conductor layer, the flexible circuit tape having an aperture therein;
a thermally conductive heat spreader directly fixed to a first surface of the flexible circuit tape, the heat spreader having a cavity aligned with the aperture of the flexible circuit tape;
a semiconductor die mounted to the heat spreader, in a die-down configuration in said cavity;
a thermally conductive die adapter fixed to said semiconductor die such that a portion of said die adapter protrudes from said cavity;
a plurality of wire bonds connecting said semiconductor die to bond sites on said second surface of said flexible circuit tape;
an encapsulating material encapsulating said semiconductor die and said wire bonds; and
a plurality of solder balls disposed on a second surface of the flexible circuit tape, in the form of a ball grid array,
wherein said die adapter comprises a plurality of thermally conductive die adapter portions fixed side-by-side on said semiconductor die.

Claim 16 (new): The cavity-down ball grid array package according to claim 15, wherein said thermally conductive die adapter comprises a plurality of thermally conductive die adapter portions stacked on said semiconductor die.

Claim 17 (new): The cavity-down ball grid array package according to claim 15, further comprising wire bonds connecting said semiconductor die to said die adapter.

Serial No. 10/694,511
January 17, 2005
Reply to the Office Action dated October 19, 2004
Page 5 of 9

Claim 18 (new): The cavity-down ball grid array package according to claim 15, further comprising wire bonds connecting said semiconductor die to said heat spreader.

Claim 19 (new): The cavity-down ball grid array package according to claim 15, further comprising wire bonds connecting said heat spreader to said die adapter.

Claim 20 (new): The cavity-down ball grid array package according to claim 15, further comprising wire bonds connecting said flexible circuit tape to said die adapter.

Claim 21 (new): The cavity-down ball grid array package according to claim 15, wherein said die adapter protrudes from said encapsulating material such that at least a surface of said die adapter is exposed.

Claim 22 (new): The cavity-down ball grid array package according to claim 16, wherein one portion of said die adapter is a solid ground.

Claim 23 (new): The cavity-down ball grid array package according to claim 16, wherein one portion of said die adapter is a solid power.